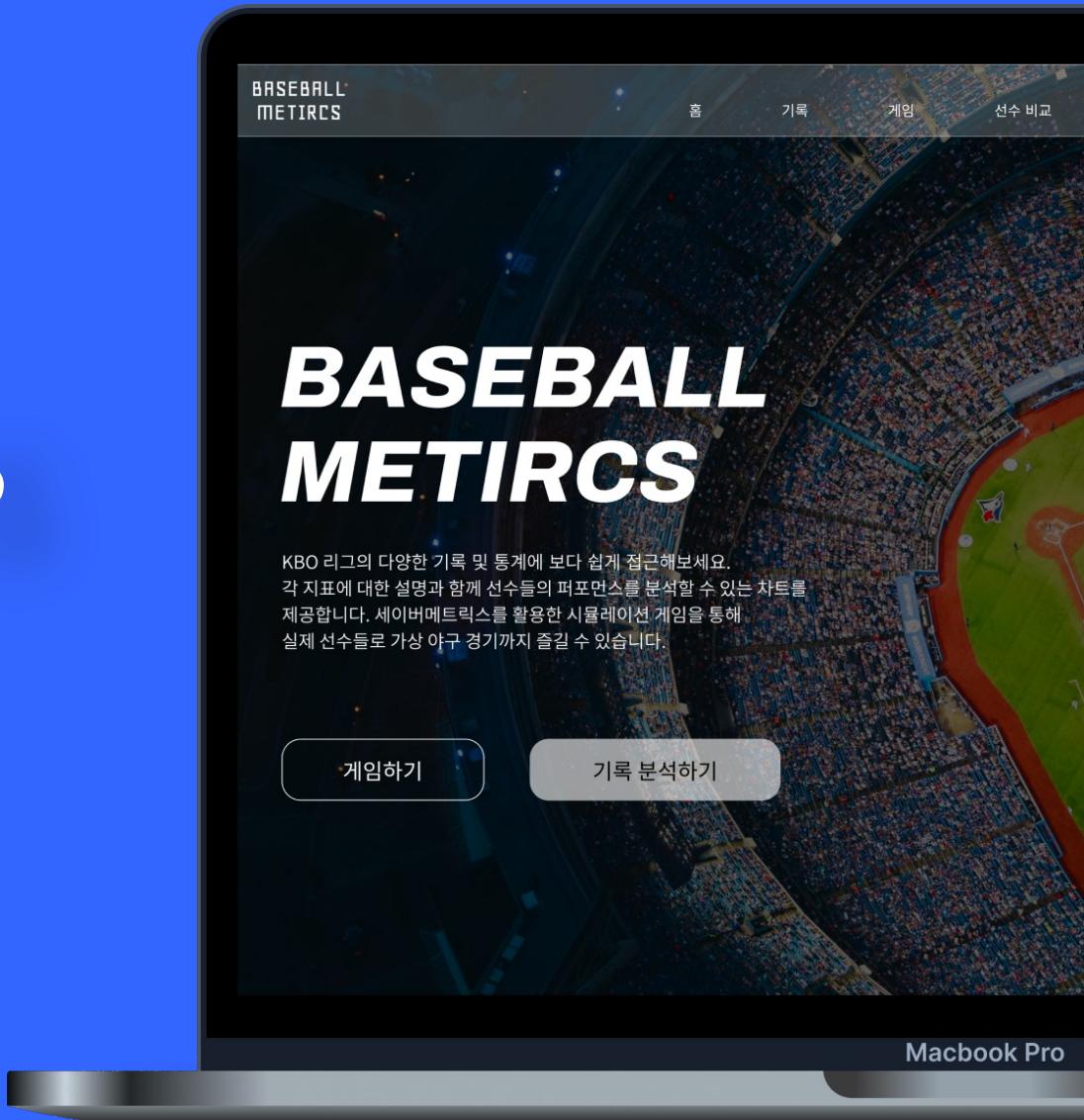


Baseball Metrics

Final Presentation

Team J 고채원 심창우 신현창

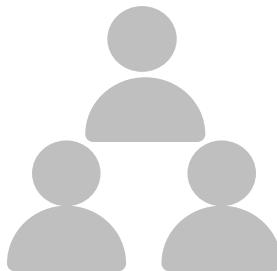


CONTENTS

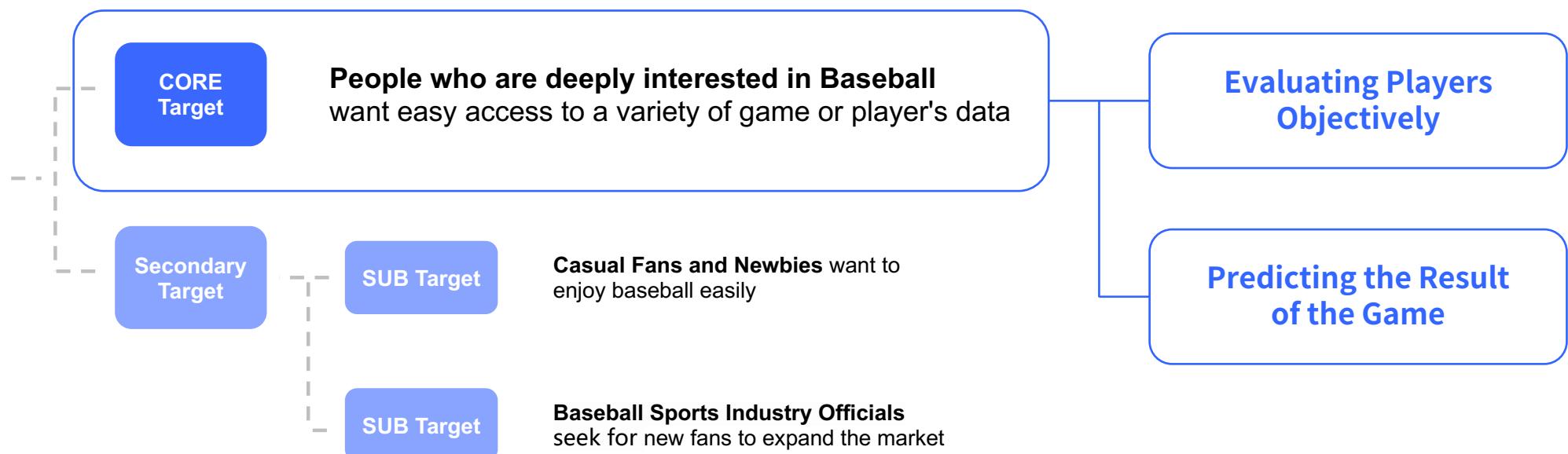
- Objective and Motivation
- Project Progress
- System Design
- Implementation
 - Frontend
 - Backend
- Challenges
- Limitation
- Evaluation
- Demo

1. Motivation & Objective

Motivation & Objective



Target & Needs



Motivation & Objective

AS-IS



Baseball Fans

- ✓ Frequently exposed to baseball stats but not clear
- ✓ Want a deeper understanding of stats to enjoy watching baseball
- ✓ Highly interested in evaluating players or predicting the outcome of baseball games

Solution

Web Platform

m

- ✓ Simple baseball line-up simulation game
- ✓ Providing explanation of the indicators together with the records
- ✓ Visualization of information comparing the competence of the players

TO-BE

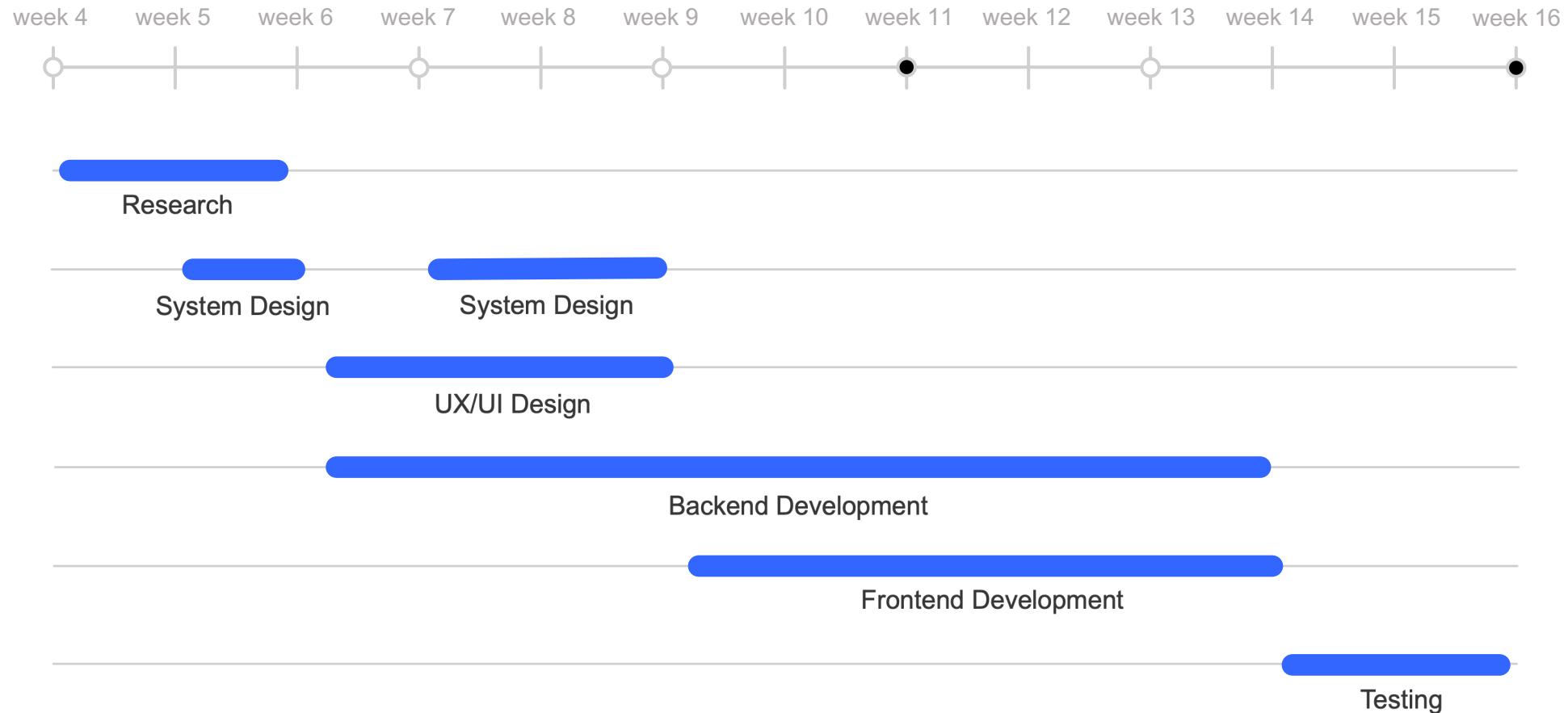


Baseball Fans

- ✓ Experience predicting the outcome of the game with real players
- ✓ Understand the indicators used in the broadcasting or the recording of the player
- ✓ Evaluate the players more objectively

2. Project Progress

Project Progress



Project Progress



Chaewon Ko

Planning & Documentation
UX/UI Design
UI Implementation



Changwoo Shim

Frontend Development
Data Crawling
Analysis System Implementation

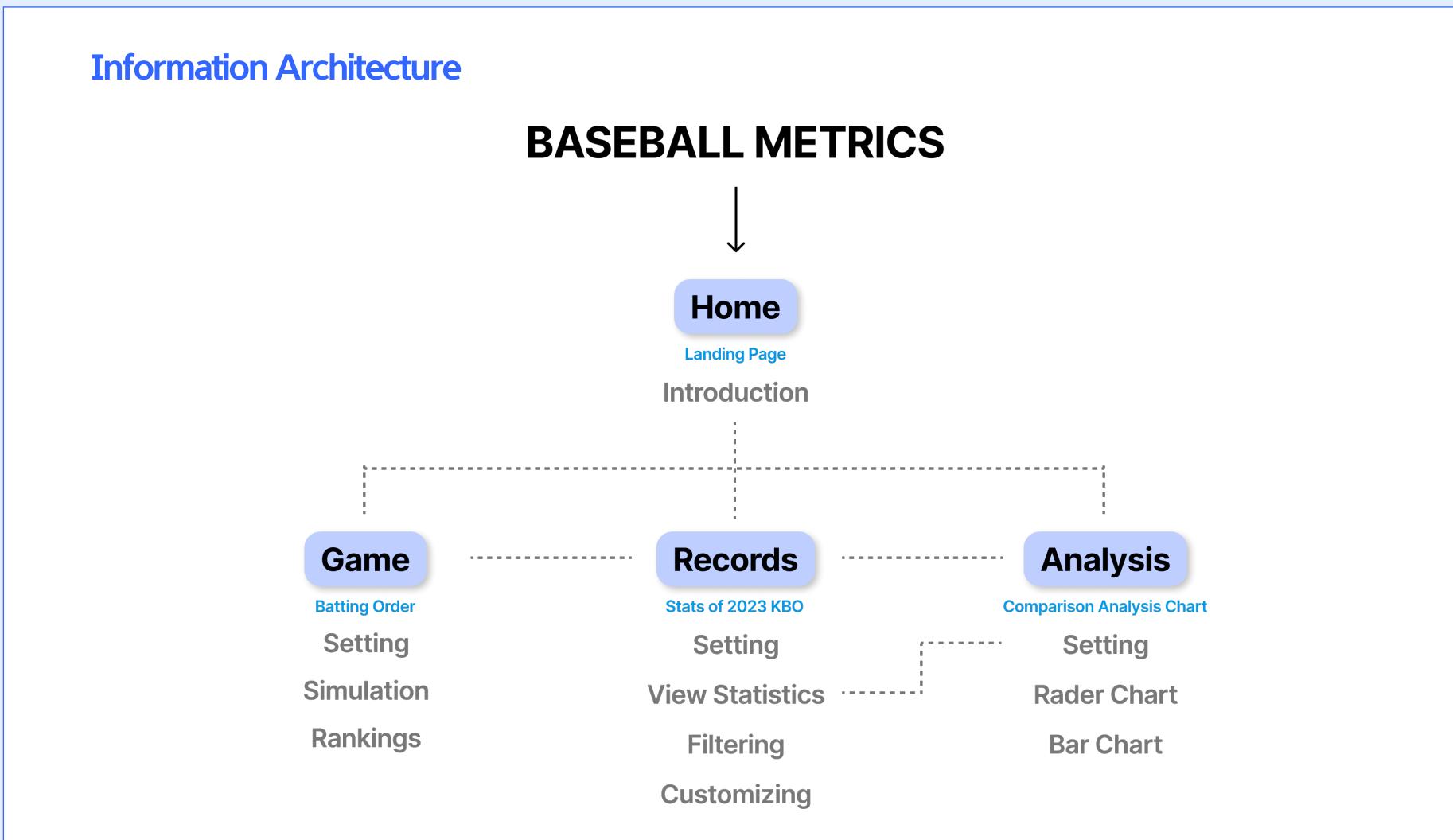


Hyeonchang Shin

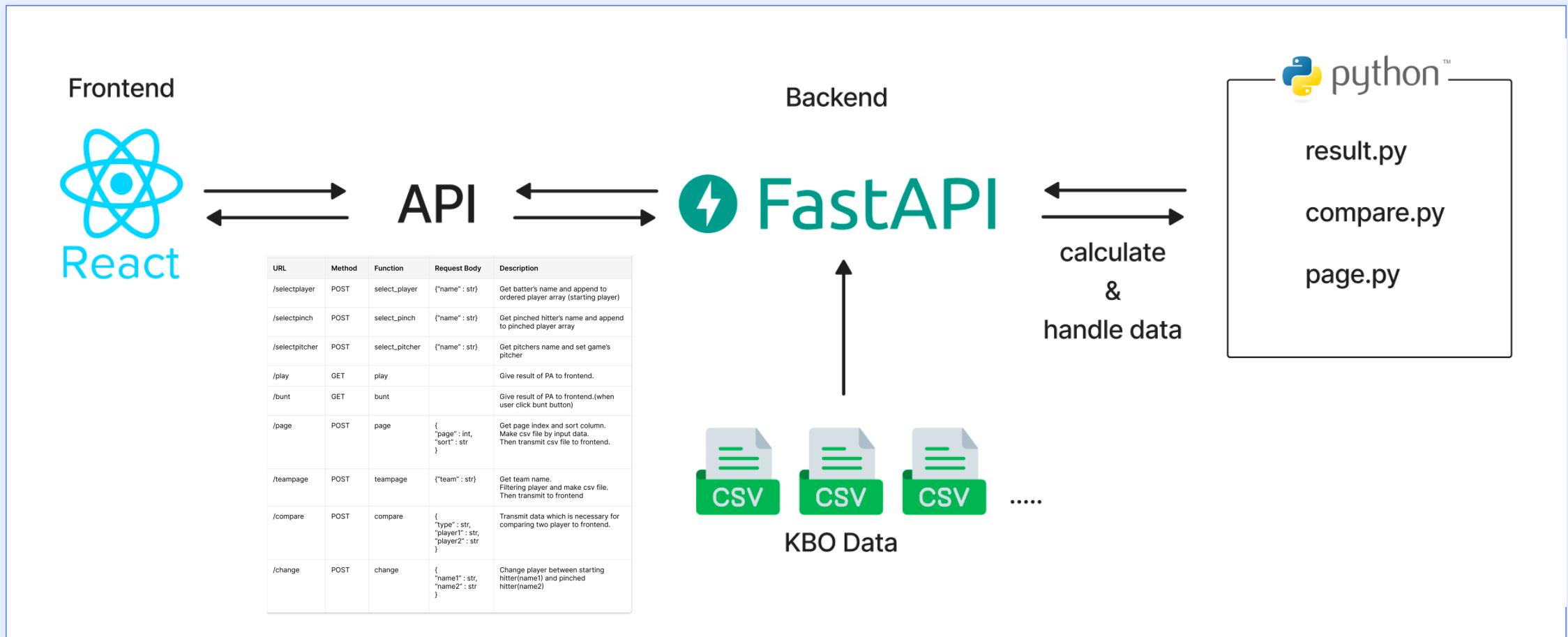
Backend Development
Game System Implementation
Front-Back Integration

3. Design

System Design: Overall



System Design: System Architecture



4. Implementation

Implementation: Frontend

BASEBALL METRICS

홈 기록 게임 선수 비교

상대 투수를 선택해주세요

순위	선수명	팀명	W-L	BB	SO	GDP	SLG	OBP	BA/RISP	데타타율	GO/AO	BB/K
1	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
2	홍성호	두산	0.400	4	3	0	0	0	0	0	0	0
3	정수빈	두산	0.400	1	2	0	0	0	0	0	0	0
4	김재호	두산	0.385	0	3	0	0	0	0	0	0	0
5	양석환	두산	0.333	2	2	0	0	0	0	0	0	0
6	허경민	두산	0.333	2	2	1	0	0	0	0	0	0
7	박유연	두산	0.308	2	2	0	0	0	0	0	0	0
8	강승호	두산	0.250	4	1	0	0	0	0	0	0	0
9	김민태	두산	0.222	4	2	0	0	0	0	0	0	0
10	로하스	두산	0.167	0	2	0	0	0	0	0	0	0
11	이유찬	두산	0.167	2	1	0	0	0	0	0	0	0
12	양천열	두산	0.167	1	1	0	0	0	0	0	0	0
13	전민재	두산	0.111	3	3	1	0	0	0	0	0	0
14	송승환	두산	0.091	2	3	0	0	0	0	0	0	0
15	박준영	두산	0.091	0	4	0	0	0	0	0	0	0

구단을 선택해주세요

LG KT SSG NC 두산 KIA 롯데 한화 삼성 키움 ALL

타자를 선택해주세요

순위	선수명	팀명	Avg	BB	SO	GDP	SLG	OBP	BA/RISP	phLI	GO/AO	BB/K
1	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
2	홍성호	두산	0.400	4	3	0	0	0	0	0	0	0
3	정수빈	두산	0.400	1	2	0	0	0	0	0	0	0
4	김재호	두산	0.385	0	3	0	0	0	0	0	0	0
5	양석환	두산	0.333	2	2	0	0	0	0	0	0	0
6	허경민	두산	0.333	2	2	1	0	0	0	0	0	0
7	박유연	두산	0.308	2	2	0	0	0	0	0	0	0
8	강승호	두산	0.250	4	1	0	0	0	0	0	0	0
9	김민태	두산	0.222	4	2	0	0	0	0	0	0	0
10	로하스	두산	0.167	0	2	0	0	0	0	0	0	0
11	이유찬	두산	0.167	2	1	0	0	0	0	0	0	0
12	양천열	두산	0.167	1	1	0	0	0	0	0	0	0
13	전민재	두산	0.111	3	3	1	0	0	0	0	0	0
14	송승환	두산	0.091	2	3	0	0	0	0	0	0	0
15	박준영	두산	0.091	0	4	0	0	0	0	0	0	0

Implementation: Frontend

BASEBALL METRICS

홈 기록 게임 선수 비교

게임이 진행 중입니다

1	2	3	4	5	6	7	8	9		R	H	B
0	0	1	■	■	■	■	■	■		■	■	■

P NC 폐 디

두산 양의지

NOW PLAYING

STRIKE ● ● ●

BALL ● ● ●

OUT ● ● ●

1 두산 양의지
2 두산 양의지
3 두산 양의지
4 두산 양의지
5 두산 양의지
6 두산 양의지
7 두산 양의지
8 두산 양의지
9 두산 양의지

진행하기 ► 대타 ↲ 번트 ✎



BASEBALL METRICS

홈 기록 게임 선수 비교

게임이 종료되었습니다

1	2	3	4	5	6	7	8	9		R	H	B
0	0	1	2	1	0	1	2	0		7	0	0

P NC 폐 디

두산 양의지

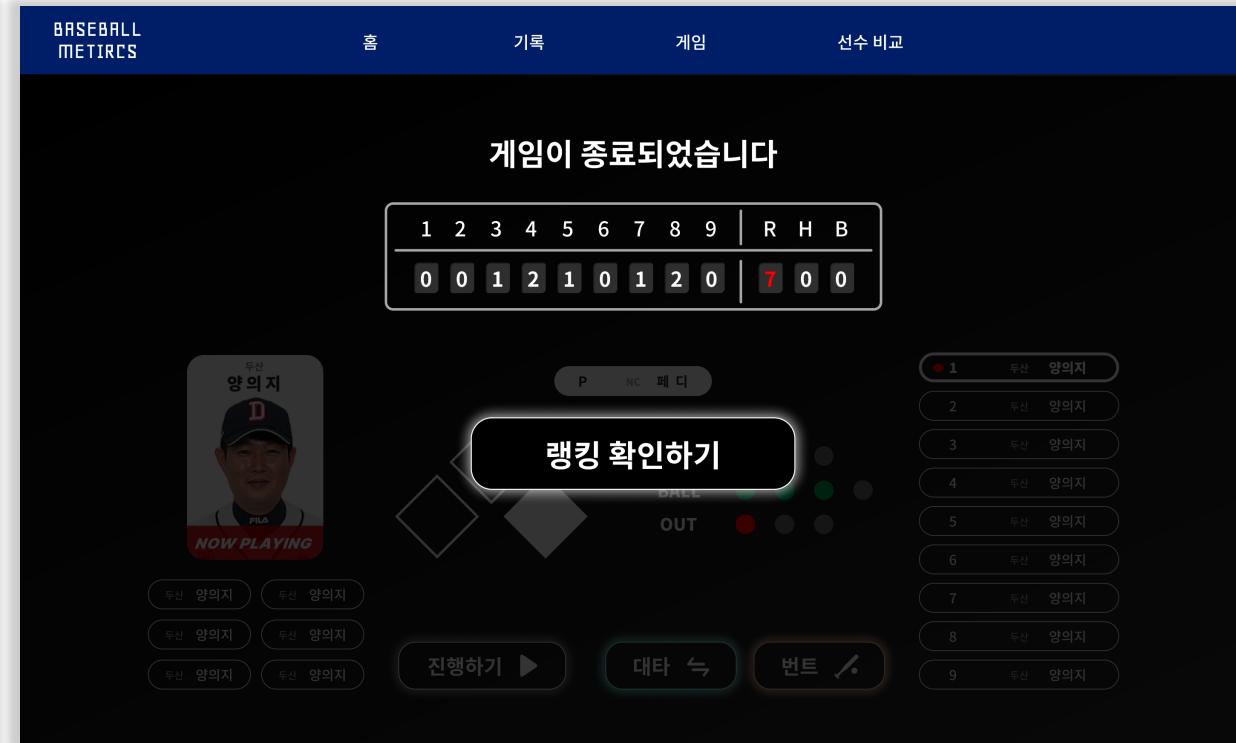
NOW PLAYING

랭킹 확인하기

OUT ● ● ●

1 두산 양의지
2 두산 양의지
3 두산 양의지
4 두산 양의지
5 두산 양의지
6 두산 양의지
7 두산 양의지
8 두산 양의지
9 두산 양의지

진행하기 ► 대타 ↲ 번트 ✎



Implementation: Frontend

BASEBALL METRICS

홈 게임 기록 선수 비교

2023.10.27 5 vs 3 BEARS
2023.10.27 5 vs 3 BEARS
2023.10.27 5 vs 3 BEARS
2023.10.27 5 vs 3 BEARS

순위	선수명	팀명	W-L	BB	SO	GDP	SLG	OBP	BA/RISP	대타타율	GO/AO	BB/K
1	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
2	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
3	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
4	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
5	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
6	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
7	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
8	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
9	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
10	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
11	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
12	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
13	양의지	두산	0.462	0	1	2	0	0	0	0	0	0
14	양의지	두산	0.462	0	1	2	0	0	0	0	0	0

필터

W-L	최솟값	이상	최댓값	이하
BB	최솟값	이상	최댓값	이하
SO	최솟값	이상	최댓값	이하

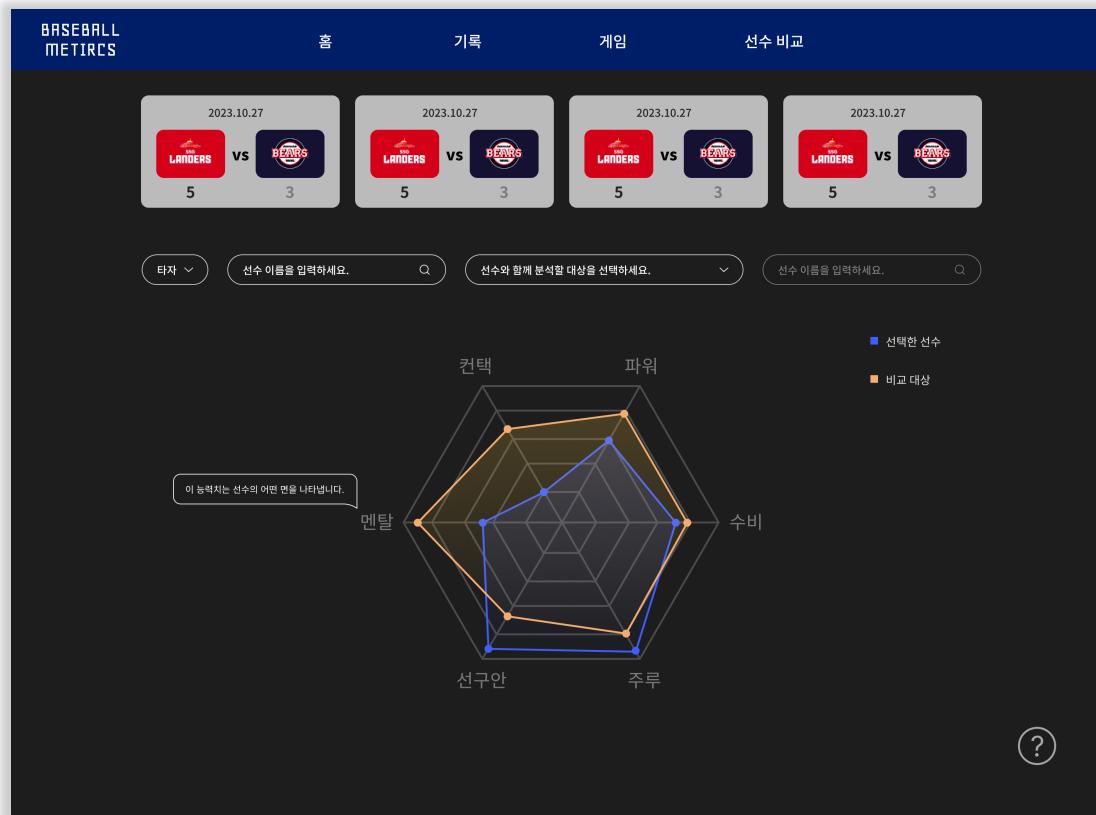
보고싶은 스탯을 선택해주세요

선택한 항목에 해당하는 기록들을 한 눈에 확인할 수 있습니다.

기본	W-L	BB	SO	GDP	SLG	OBP	BA/RISP	BB/K
확장	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
클러치	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
타구1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

13 양의지 두산 0.462 0 1 2 0 0 0 0 0
14 양의지 두산 0.462 0 1 2 0 0 0 0 0

Implementation: Frontend



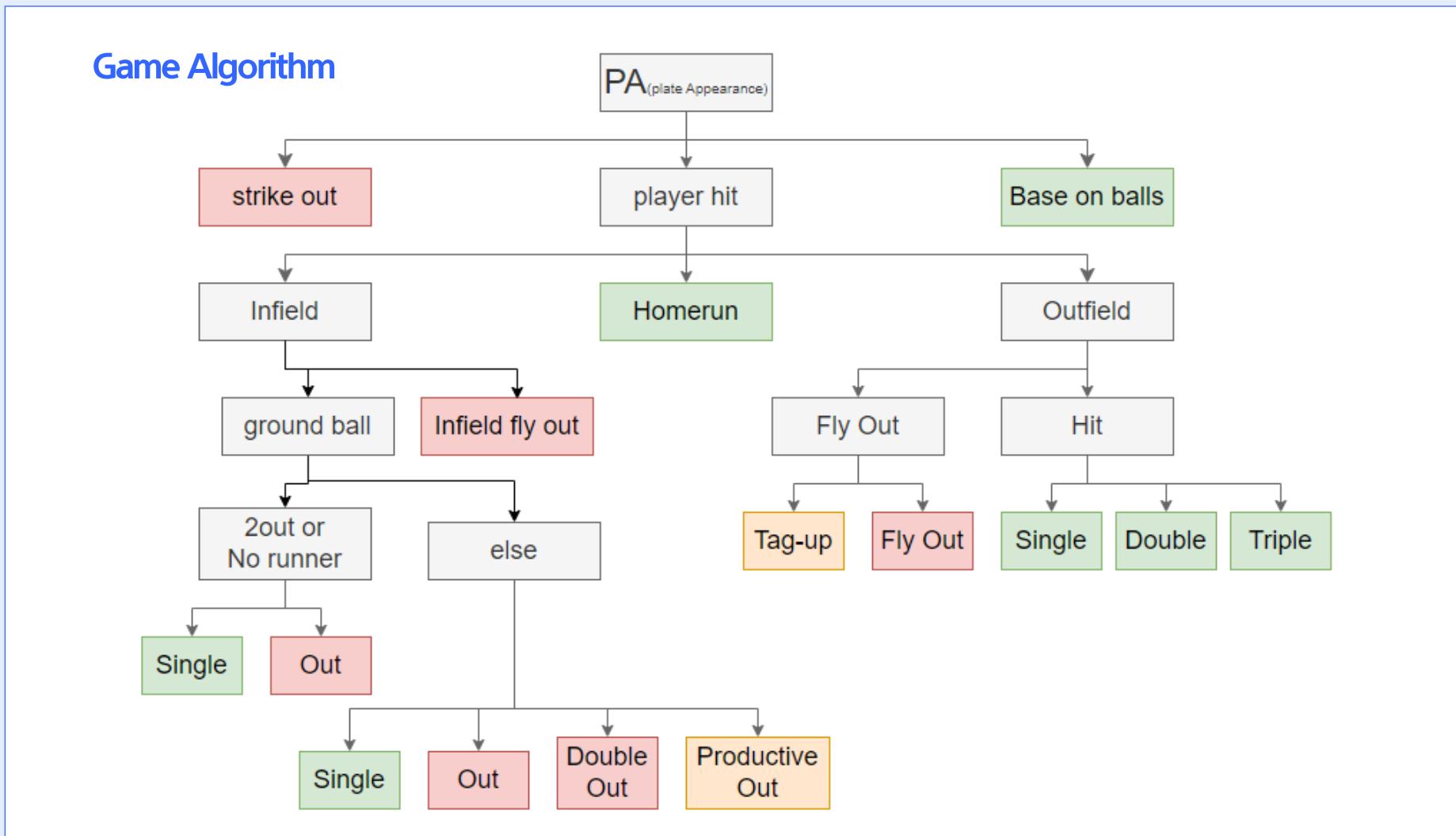
Implementation: Data



BeautifulSoup
A Papa Parse

📄	battersBasic.csv
📄	battersClutch.csv
📄	battersExp.csv
📄	battersHit1.csv
📄	battersHit2.csv
📄	battersPA.csv
📄	battersPower.csv
📄	battersTeambat1.csv
📄	battersTeambat2.csv
📄	battersValue.csv
📄	pitcherGame.csv

Implementation: Backend



Implementation: Backend

API

URL	Method	Function	Request Body	Description
/selectplayer	POST	select_player	{"name" : str}	Get batter's name and append to ordered player array (starting player)
/selectpinch	POST	select_pinch	{"name" : str}	Get pinched hitter's name and append to pinched player array
/selectpitcher	POST	select_pitcher	{"name" : str}	Get pitchers name and set game's pitcher
/play	GET	play		Give result of PA to frontend.
/bunt	GET	bunt		Give result of PA to frontend.(when user click bunt button)
/page	POST	page	{ "page" : int, "sort" : str }	Get page index and sort column. Make csv file by input data. Then transmit csv file to frontend.
/teampage	POST	teampage	{"team" : str}	Get team name. Filtering player and make csv file. Then transmit to frontend
/compare	POST	compare	{ "type" : str, "player1" : str, "player2" : str }	Transmit data which is necessary for comparing two player to frontend.
/change	POST	change	{ "name1" : str, "name2" : str }	Change player between starting hitter(name1) and pinched hitter(name2)

Implementation: Backend

6 Ability Algorithm: Batter

Power: How far the batter can send the ball

Homerun, SLG(how many bases a batter reach per at-bat), Spd (ability of speed)

Contact: How well the batter hits the ball and precisely

Contact%, cut after 2S%(Cut: contact the ball but foul)

Batting Eye: How well the batter can distinguish between a ball and a strike

Batting eye after 2S%, IsoD(pure on-base percentage = on-base% - AVG%)

Mentality: How well the batter is in important situations

Clutch(ability at important situation), WPA(win probability added)

Speed: Running speed of the batter and the sense of base running

Spd, Steal(1B→2B while pitch), F23(probability of 2B→3B at fly out), H13(probability of 1B→3B at single hits)

Defense: The batter's ability to defend.

Defense RAA(ability of defense)

Implementation: Backend

5 Ability Algorithm: Pitcher

Ball Power: Pitcher's ability to disrupt the batter using various trajectories and techniques

K/9, LSO%, SwStr%, Contact_IZ%, Swing_OZ%

Ball Speed: How fast the pitcher can throw a ball.

Fastball Speed

Ball Control: Pitcher's ability to pitch exactly where he wants to be

BB/9, LSO%

Mentality: Mental ability to maintain performance with stable mental strength even in difficult situations

LOB%, WHIP, Double play rate

Strength: How many innings a pitcher can take and how many pitches he can pitch

Starter: IP/G(Innings per game) P/G(pitches per game)

Relief: G, P/IP

5. Challenges

Challenges



Providing Description of Metrics

How are we going to ensure objectivity and consistency in our own descriptions?



Creating Metrics Record Table

How can we import new tables for player selection or fetch player indicator tables?



Data Processing

How are we going to crawl massive amount of data at once?

MLB Reference
Standardized Sentence Structure

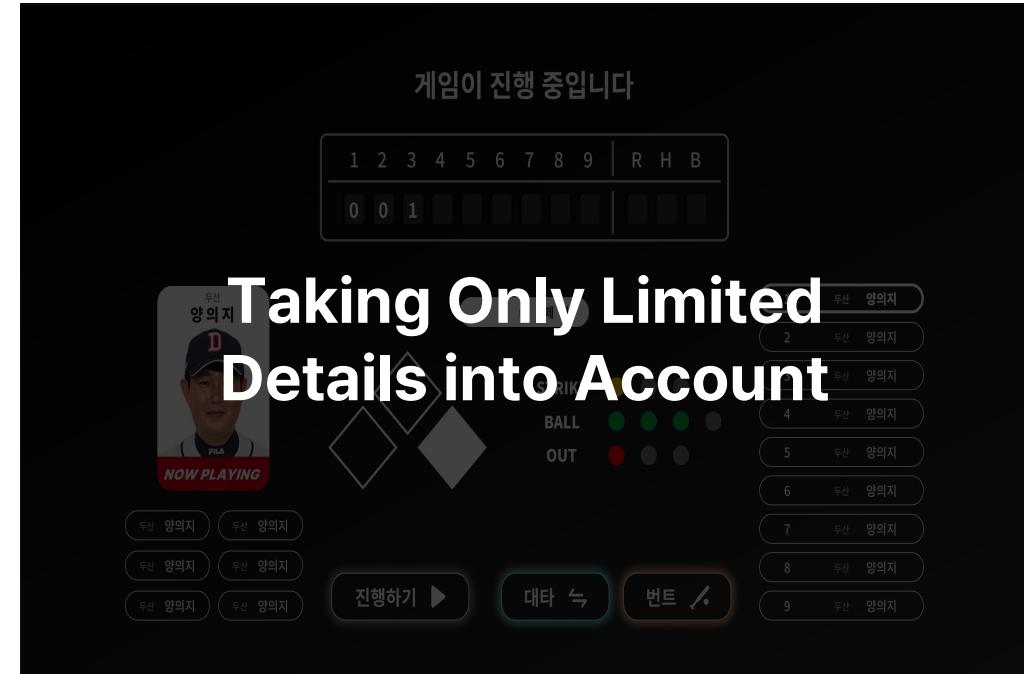
Generation and
Transmission of CSV files

Page-by-Page
Crawling Approach

6. Limitations

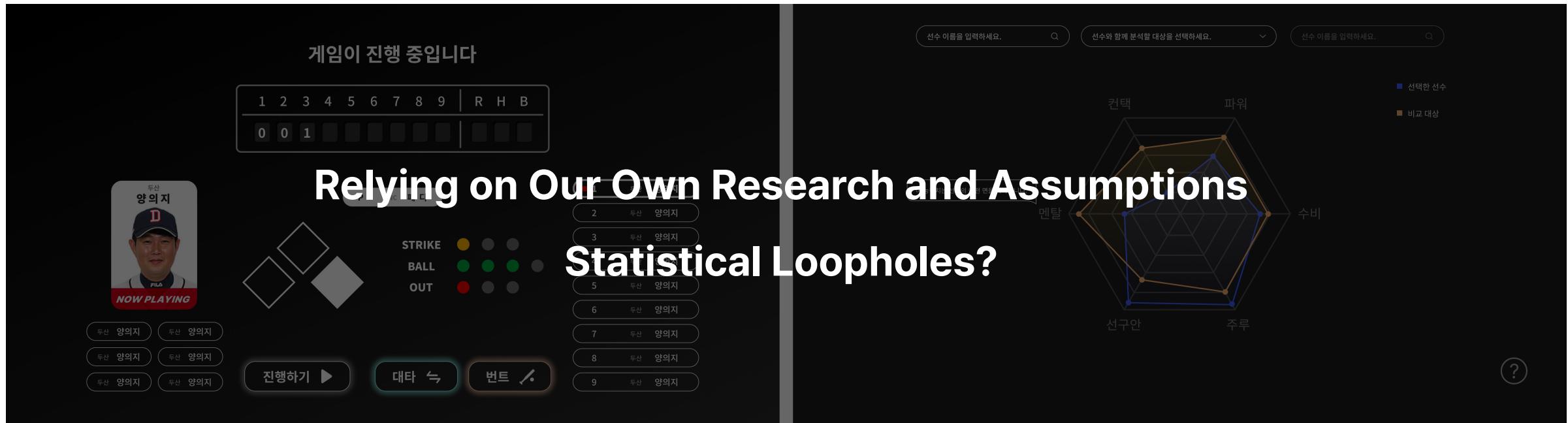
Limitations

Gap Between Real Baseball and Simulation



Limitations

Reliability of Self-Supplied Information



7. Evaluation

Evaluation

How Accurate is our Game Simulation?

Testing Plan

Select real game sample

Set the opposing pitcher and batting order
matching the sample

Run Simulation 20 times

Get an average of the results of 20 games

Adjust the number of innings of the sample
to 9 and calculate the according result

Evaluation

Testing Result

	삼성 vs Barnes	NC vs Elias	한화 vs Alcantara
Simulation Result	3 hits, 3 walks, 0 home runs	1.05 home runs 13.85 hits, 1.70 walks	10.95 hits, 2.40 walks, 3.25 runs
Adjusted Real Game Result	1.5 runs, 4.5 hits, 4.5 walks	12 runs, 24 hits, 3 home runs	3.9 hits, 2.6 walks, 0 runs

The game consistently tends to achieve higher scores than real games.

⇒ batter performance is not only gauged against proficient pitchers but also against those with comparatively lesser proficiency.

⇒ the games chosen for testing may not necessarily represent the player's average performance.

8. Demo

Q & A